

This Page Is Inserted by IFW Operations
and is not a part of the Official Record

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

IMAGES ARE BEST AVAILABLE COPY.

**As rescanning documents *will not* correct images,
please do not report the images to the
Image Problem Mailbox.**

WHAT IS CLAIMED IS:

1. An ink comprising
 - (i) first and second organic compounds which are incompatible with each other;
 - 5 (ii) at least one of a compound exhibiting fluorescence properties and a coloring material exhibiting fluorescence properties; and
 - (iii) a liquid medium dissolving or dispersing the components (i) and (ii) therein.

10

2. The ink according to Claim 1, wherein the ink is a water-based ink.

15 3. The ink according to Claim 1, wherein the liquid medium is water.

20 4. The ink according to Claim 1, which is applied to a recording medium from an ink applying means wherein there is a gap between the ink applying means and the recording medium.

25 5. The ink according to Claim 1, wherein the content of the component (ii) in the ink is at most 1.5 % by weight.

6. The ink according to Claim 5, wherein the content of the component (ii) in the ink is at most 1.0

* by weight based on the total weight of the ink.

7. The ink according to Claim 1, wherein the component (ii) is water-soluble or hydrophilic.

5

8. The ink according to Claim 1, wherein the content of the component (ii) in the ink is at least a concentration sufficient to exhibit the maximum fluorescence intensity in the ink.

10

9. The ink according to Claim 8, wherein the content of the component (ii) in the ink is at least a concentration sufficient to exhibit the maximum fluorescence intensity in a state dissolved in water.

15

10. The ink according to Claim 1, wherein the component (i) dissolves, disperses, or dissolves and disperses the component (ii) therein.

20

11. The ink according to Claim 1, wherein one of the first and second organic compounds of the component (i) has a solubility parameter value of at least 15, and the other has a solubility parameter value of at most 13.

25

12. The ink according to Claim 1, wherein the first and second organic compounds of the component (i)

are nonpolar compounds.

13. The ink according to Claim 1, wherein the
first and second organic compounds of the component (i)
5 are both water-soluble.

14. The ink according to Claim 13, wherein the
first and second organic compounds of the component (i)
are both liquid.

10

15. The ink according to Claim 1, wherein one of
the first and second organic compounds of the component
(i) has a glycerol group.

15

16. The ink according to Claim 15, wherein the
organic compound having a glycerol group has at least 3
hydroxyl groups.

20

17. The ink according to Claim 15, wherein the
organic compound having a glycerol group is liquid at
normal temperature.

25

18. The ink according to Claim 1, wherein the
other of the first and second organic compounds of the
component (i) is a nonionic surfactant.

19. The ink according to Claim 18, wherein the

nonionic surfactant is liquid at normal temperature.

20. The ink according to Claim 18, wherein HLB of the nonionic surfactant is at most 13.

5

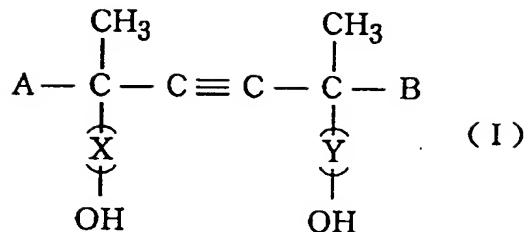
21. The ink according to Claim 18, wherein the nonionic surfactant has a cloud point.

10 22. The ink according to Claim 20, wherein the nonionic surfactant is contained in an amount that the nonionic surfactant is not separated at an interface of an aqueous solution in a state of the aqueous solution.

15 23. The ink according to Claim 22, wherein the nonionic surfactant is contained in an amount that the nonionic surfactant is not separated at an interface of the ink in a state of an ink from which the component (ii) has been removed.

20 24. The ink according to Claim 18, wherein the nonionic surfactant has an acetylene group.

25 25. The ink according to Claim 24, wherein the nonionic surfactant has a structure represented by the following general formula (I)



5 wherein A and B are, independently of each other, $\text{C}_n\text{H}_{2n+1}$ (n being an integer of 1 to 10), and X and Y are, independently of each other, a ring-opening ethylene oxide unit and/or a ring-opening propylene oxide unit.

10 26. The ink according to Claim 18, wherein the nonionic surfactant is contained in a proportion of at least 1 % by weight based on the total weight of the ink.

15 27. The ink according to Claim 1, which further comprises a monohydric alcohol.

20 28. The ink according to Claim 1, which further comprises a coloring material exhibiting no fluorescence properties.

25 29. The ink according to Claim 28, wherein the coloring material exhibiting no fluorescence properties is a coloring material having water solubility.

30. The ink according to Claim 28, wherein the coloring material exhibiting no fluorescence properties

is a coloring material directly coloring a recording medium.

31. The ink according to Claim 28, wherein the
5 coloring material exhibiting no fluorescence properties
is an azo dye.

32. The ink according to Claim 28, wherein the
content of the coloring material exhibiting no
10 fluorescence properties in the ink is not lower than
the content of the coloring material exhibiting
fluorescence in the ink.

33. The ink according to Claim 28, wherein the
15 coloring material exhibiting no fluorescence properties
has a carboxyl group or its salt group.

34. The ink according to Claim 28, wherein the
counter ion to the hydrophilic group of the coloring
20 material exhibiting no fluorescence properties contains
at least one ammonium ion.

35. The ink according to Claim 1, which further
comprises at least one selected from urea and urea
25 derivatives.

36. The ink according to Claim 35, wherein the

urea derivative is not a cyclic compound.

37. The ink according to Claim 35, wherein the
urea derivative is at least one selected from the group
5 consisting of alkyl derivatives of urea and ethylene
oxide and/or propylene oxide adducts of urea.

38. The ink according to Claim 1, which further
comprises a compound having a solubility parameter
10 value between the solubility parameter values of the
two organic compounds incompatible with each other.

39. The ink according to Claim 1, which further
comprises a compound having a vapor pressure not higher
15 than that of triethylene glycol.

40. The ink according to Claim 1, which further
comprises a compound having a vapor pressure not lower
than that of diethyleneglycol.

20

41. The ink according to Claim 40, wherein the
compound having a vapor pressure not lower than that of
diethyleneglycol has a solubility parameter between the
solubility parameters of the first and the second
25 organic compounds incompatible with each other.

42. The ink according to Claim 40 or 41, wherein

the compound having a vapor pressure of not lower than that of diethyleneglycol is at least one of diethylene glycol and ethylene glycol.

5 43. The ink according to Claim 1, wherein the ink from which the compound exhibiting fluorescence properties and/or the coloring material exhibiting fluorescence properties, additives and the other coloring material have been removed is nonionic.

10

44. The ink according to Claim 1, wherein the surface tension of the ink is at most 40 mN/m (dyn/cm).

15 45. The ink according to Claim 1, wherein the ink has the pH of at least 8.

20 46. The ink according to Claim 1, wherein the coloring material of the ink has two counter ions, one of which is an ammonium ion and the other is an alkali metal ion.

25 47. The ink according to Claim 1, which has a maximum wavelength for excitation and a fluorescence maximum wavelength, and the maximum wavelength for excitation is shorter than the fluorescence maximum wavelength.

48. The ink according to Claim 1, which is an ink for ink-jet recording.

5 49. An ink-jet recording process, comprising the step of ejecting the ink according to Claim 48 from an orifice in response to recording signals.

10 50. The ink-jet recording process according to Claim 49, wherein the step comprises a sub-step of applying thermal energy to the ink to eject the ink from an orifice.

15 51. A recorded article obtained by the ink-jet recording process according to Claim 50, wherein the fluorescence intensity of a recorded portion formed on wood-free paper has a proportional relationship to the water content in the wood-free paper.

20 52. The recorded article according to Claim 51, which has a maximum wavelength for excitation and a fluorescence maximum wavelength, and the maximum wavelength for excitation is shorter than the fluorescence maximum wavelength.

25 53. A recorded article having a colored portion exhibiting fluorescence on a recording medium, wherein the colored portion contains at least one of a compound

exhibiting fluorescence and a coloring material exhibiting fluorescence and has an interface at which incident light on the colored portion is reflected, the interface being between the outermost surface thereof
5 and the surface of the recording medium.

54. A recording unit comprising an ink container containing the ink according to Claim 48 and a head portion for ejecting the ink.

10

55. The recording unit according to Claim 54, wherein the head portion has a construction that thermal energy is applied to the ink to eject the ink.

15

56. The recording unit according to Claim 54, wherein the ink container comprises a polyolefin.

20

57. The recording unit according to Claim 54, wherein the ink container has an ink holding member therein.

25

58. The recording unit according to Claim 57, wherein the ink holding member comprises at least one selected from the group consisting of polyurethane, cellulose, polyvinyl acetate and polyolefin.

59. The recording unit according to Claim 57,

wherein the ink holding member comprises a polymer formed by a condensation or polymerization reaction of organic compound(s).

5 60. The recording unit according to Claim 57, wherein the ink holding member comprises a porous material.

10 61. The recording unit according to Claim 60, wherein the ink holding member has a surface being in contact with the ink container.

15 62. The recording unit according to Claim 57, wherein the ink holding member has a multi-layer structure.

20 63. The recording unit according to Claim 62, wherein the direction of the multi-layer arrangement of the multi-layer structure is aligned in an ink discharging direction of the ink container.

25 64. The recording unit according to Claim 62, wherein the ink holding member has a contact surface with the ink container.

65. The recording unit according to Claim 57, wherein the ink holding member is composed of fiber

5 flocculate.

66. The recording unit according to Claim 65,
wherein the fiber flocculate is aligned in an ink
5 discharging direction of the ink container.

67. The recording unit according to Claim 66,
wherein the ink holding member has a contact surface
with the ink container.

10

68. An ink cartridge comprising an ink container
containing the ink according to any of Claims 1 to 48.

15 69. The ink cartridge according to Claim 68,
wherein the ink container comprises a polyolefin.

70. The ink cartridge according to Claim 68,
wherein the ink container has an ink holding member
therein.

20

71. The ink cartridge according to Claim 70,
wherein the ink holding member comprises at least one
selected from the group consisting of polyurethane,
cellulose, polyvinyl acetate and polyolefin.

25

72. The ink cartridge according to Claim 70,
wherein the ink holding member is composed of a polymer

formed by a condensation or polymerization reaction of organic compound(s).

73. The ink cartridge according to Claim 70,
5 wherein the ink holding member has a porous structure.

74. The ink cartridge according to Claim 73,
wherein the ink holding member has a contact surface
with the ink container.

10

75. The ink cartridge according to Claim 70,
wherein the ink holding member has a multi-layer
structure.

15

76. The ink cartridge according to Claim 75,
wherein the direction of the multi-layer arrangement of
the multi-layer structure is aligned in an ink
discharging direction of the ink container.

20

77. The ink cartridge according to Claim 76,
wherein the ink holding member has a contact surface
with the ink container.

25 78. The ink cartridge according to Claim 70,
wherein the ink holding member is composed of fiber
flocculate.

79. The ink cartridge according to Claim 78,
wherein the fiber flocculate is aligned in an ink
discharging direction of the ink container.

5 80. The ink cartridge according to Claim 79,
wherein the ink holding member has a contact surface
with the ink container.

10 81. An ink-jet recording apparatus comprising an
ink container containing the ink according to Claim 48
and a head portion for ejecting the ink.

15 82. A method of enhancing fluorescence of a
fluorescent colored portion of a recorded article
comprising a recording medium and the colored portion
provided thereon, wherein the colored portion is formed
by an ink-jet recording process comprising the step of
applying an ink to a recording medium by an ink-jet
system, and an ink comprising

20 (i) first and second organic compounds which are
incompatible with each other;

(ii) at least one of a compound exhibiting
fluorescence and a coloring material exhibiting
fluorescence; and

25 (iii) a liquid medium dissolving or dispersing
the components (i) and (ii) therein
is used as said ink.

83. A method of enhancing fluorescence of a fluorescent colored portion of a recorded article comprising a recording medium and the colored portion provided thereon, which comprises providing a reflecting interface for incident light on the colored portion from the outside between the outermost surface of the colored portion and the surface of the recording medium at the colored portion.

10 84. A method of elongating the life time of fluorescence of a fluorescent colored portion of a recorded article comprising a recording medium and the colored portion provided thereon, wherein the colored portion is formed by an ink-jet recording process

15 comprising the step of applying an ink to a recording medium by an ink-jet system, and an ink comprising

20 (i) first and second organic compounds which are incompatible with each other;

(ii) a compound having a vapor pressure not lower than that of diethyleneglycol ;

(iii) at least one of a compound exhibiting fluorescence properties and a coloring material exhibiting fluorescence properties; and

25 (iv) a liquid medium dissolving or dispersing the components (i), (ii) and (iii) therein is used as said ink.